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Initial Lessons Learnt from Manufacturers-Operator Sharing Programs

by Jean Jacques SPEYER
Manager Operational Evaluation & Communication
Flight Operations Support
Airbus Industrie Customer Services

Structure of the Presentation

- Introduction : The Remarkable Story of Risk
- Manufacturers - Operators Sharing Programs
- Lessons Learnt from Sharing Programs
- Towards Risk Management with Databases
- Conclusion : Initial Lessons for Proactive Safety

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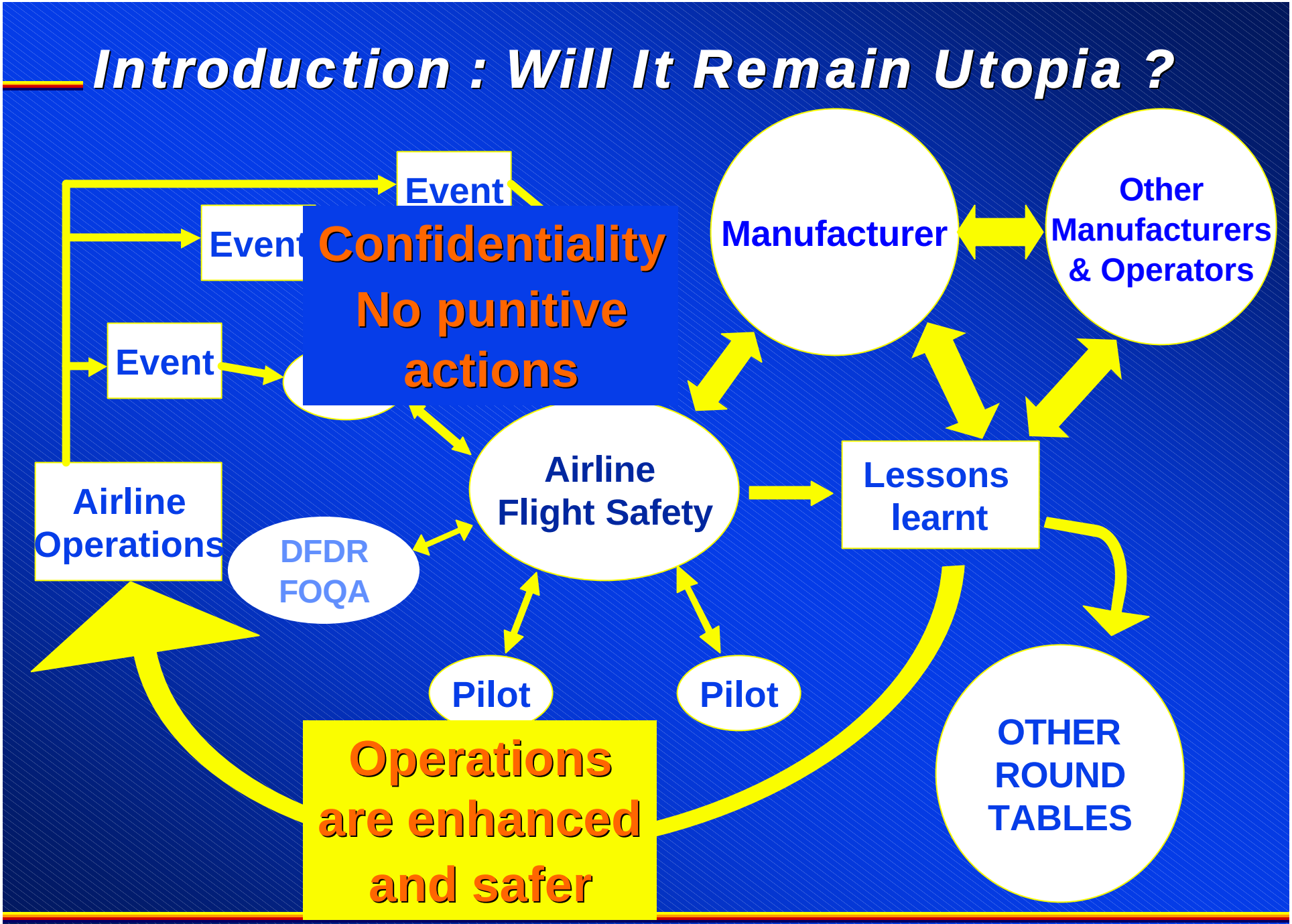
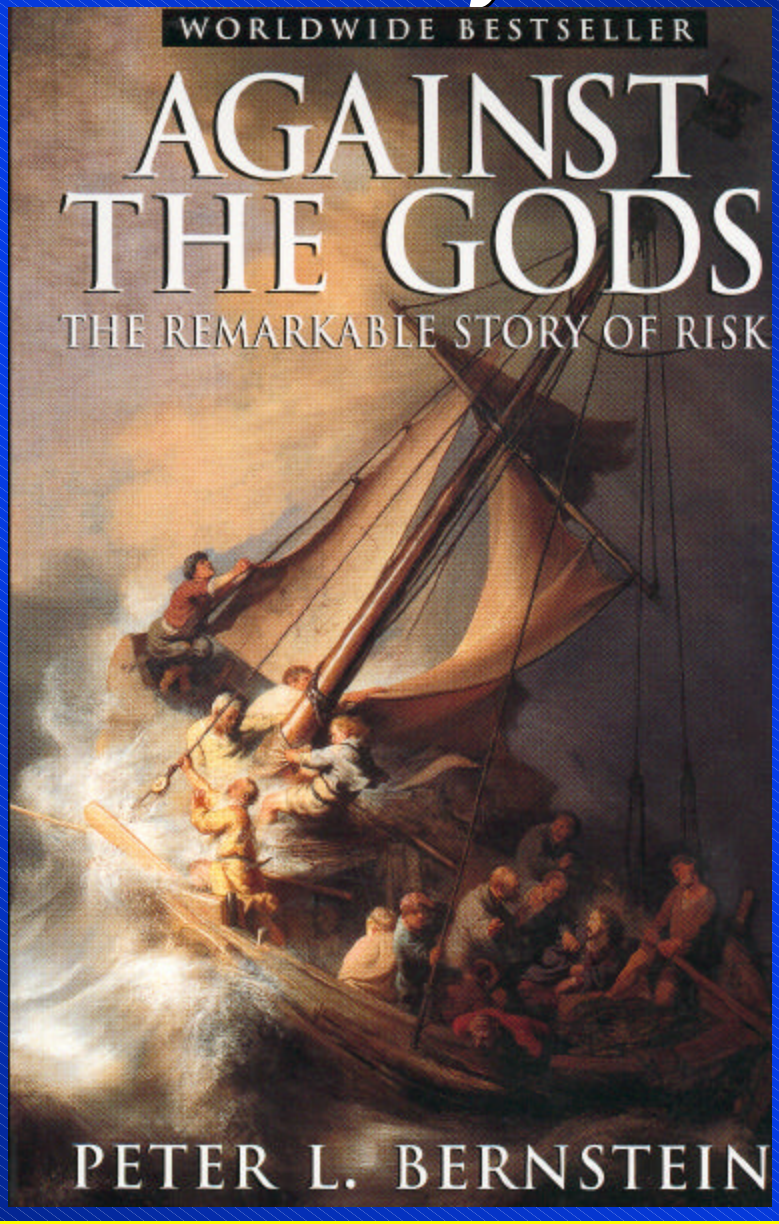
Introduction : Will It Remain Utopia ?



Towards an Information Sharing Culture

The Remarkable Story of Risk



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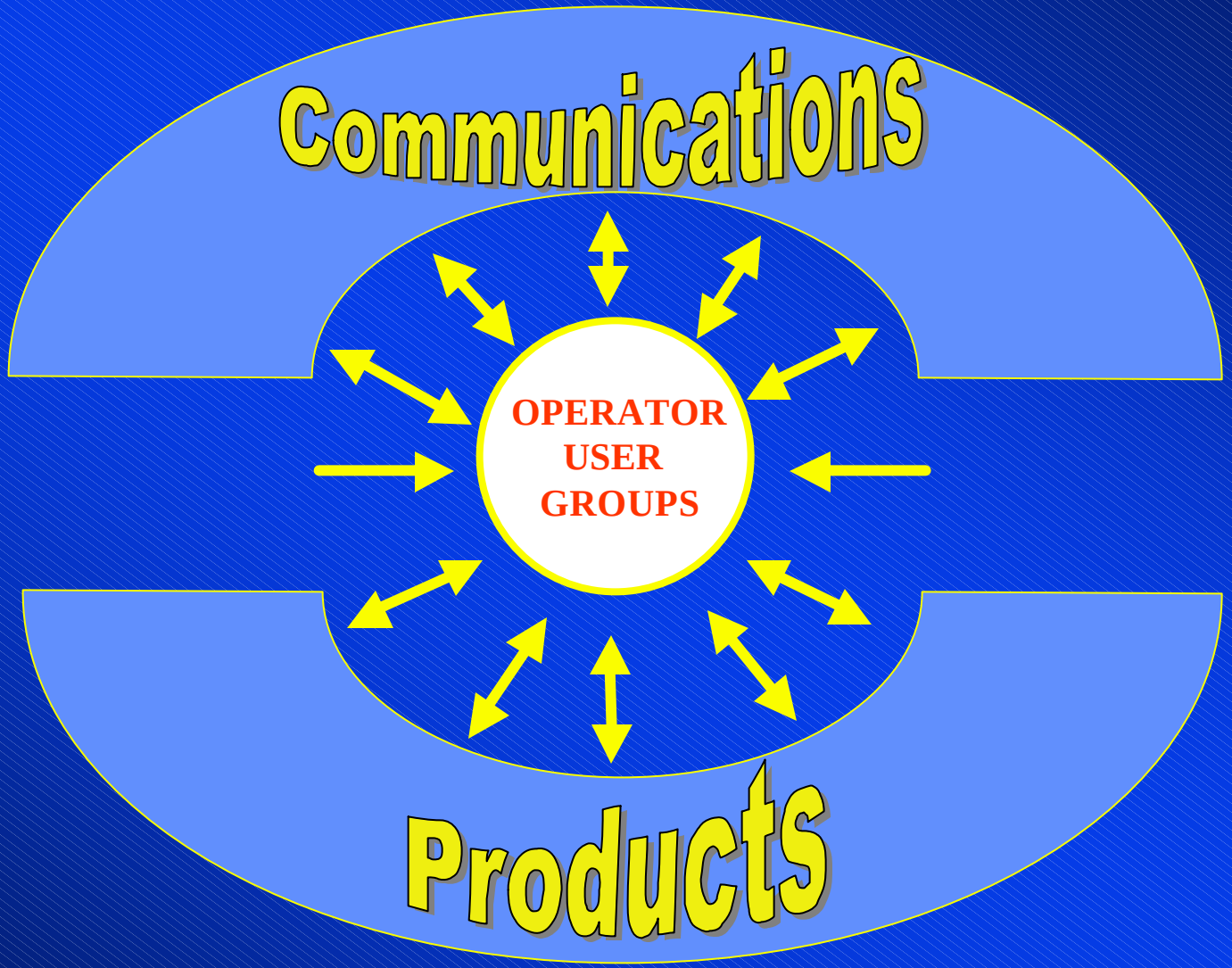
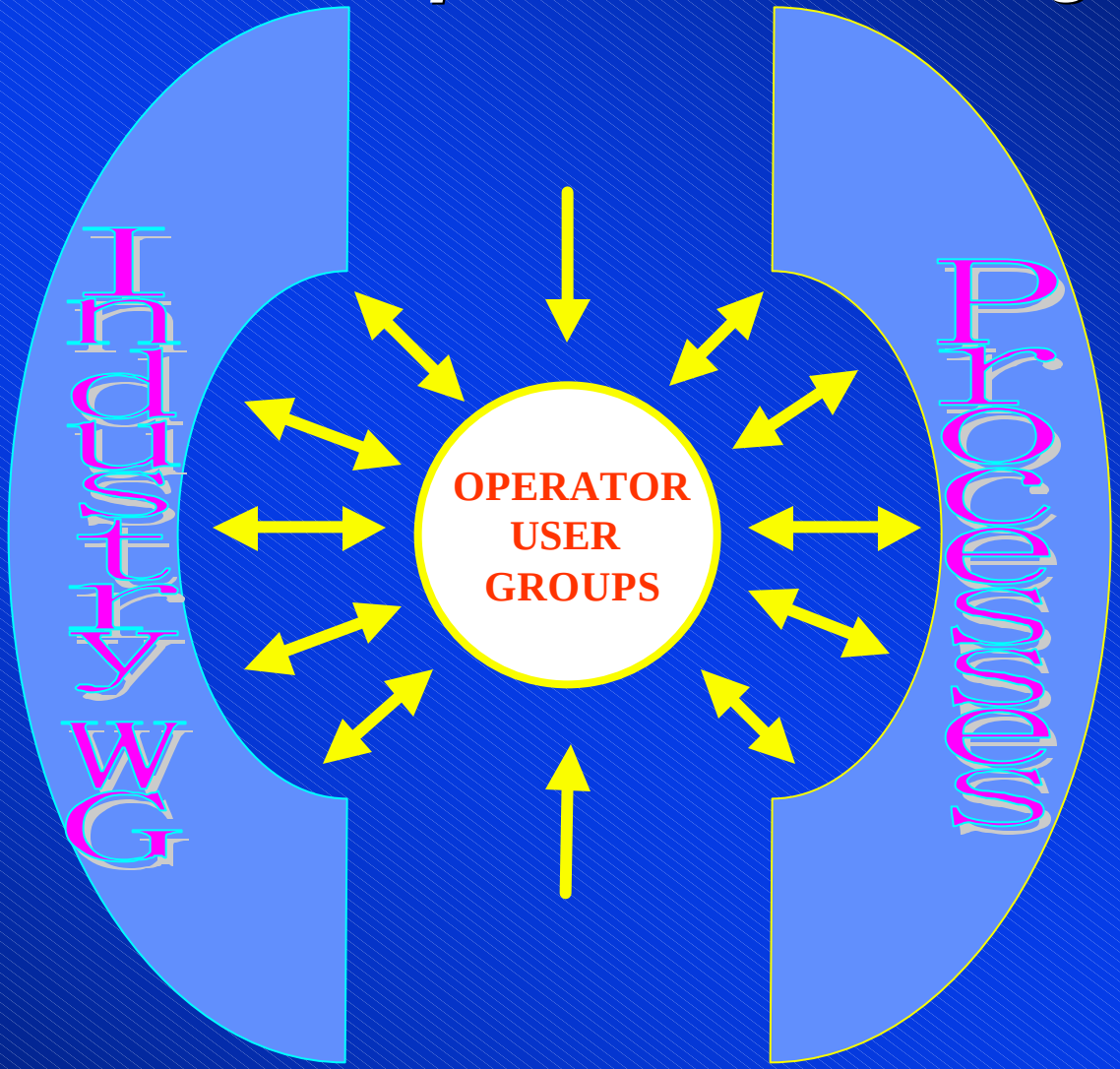
Manufacturer-Operator Sharing Schemes

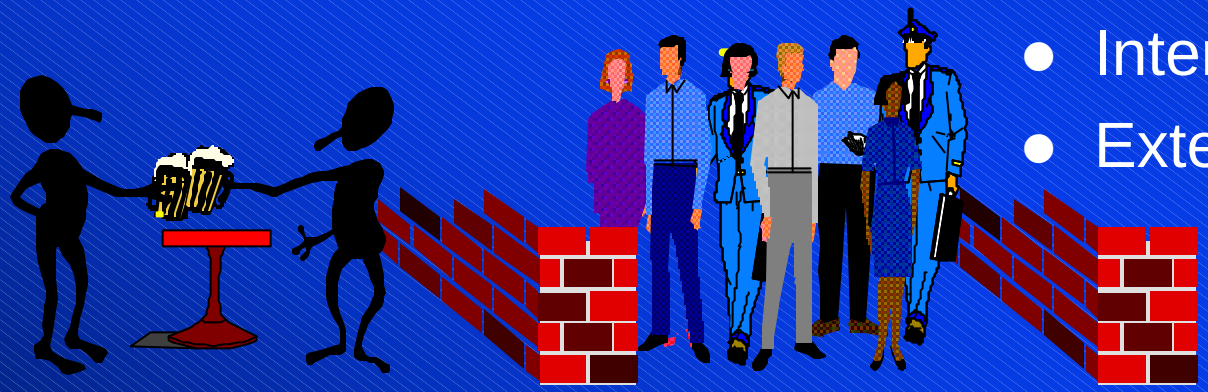


Manufacturer-Operator Sharing Programs



Concerning Voluntary Aircrew Incident Reporting

- AIRS to Promote Sharing of Operational Incidents
  - ASRs
    and / or
  - HFRs
- Internal Sharing
- External Sharing



Front Line

Airline

Manufacturer

Lessons on Events specifically

Lessons on Feedback itself

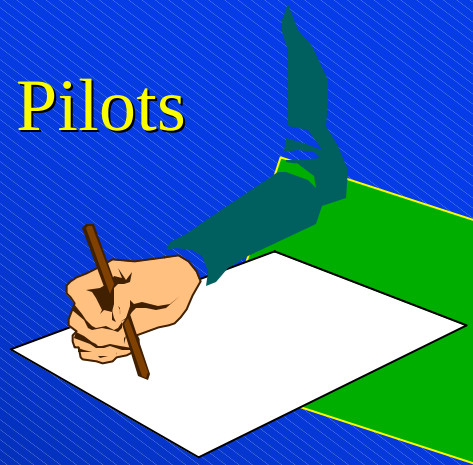
From Incident Data to Information with AIRS

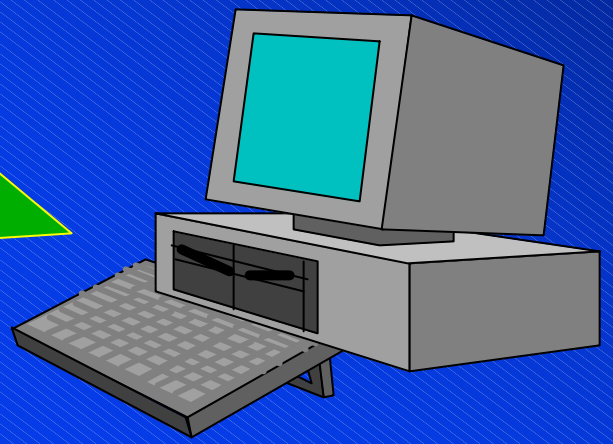
Pilots

Flight OPS Co-ordinator

DE-IDENTIFICATION

NARRATIVE REPORT





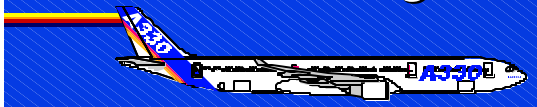
AIRS
ASR or HFR Questionnaire
Identification Slip

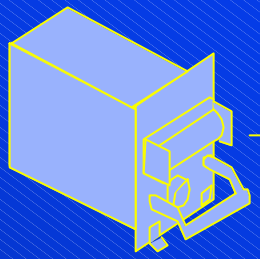
Reporting Form

DATA

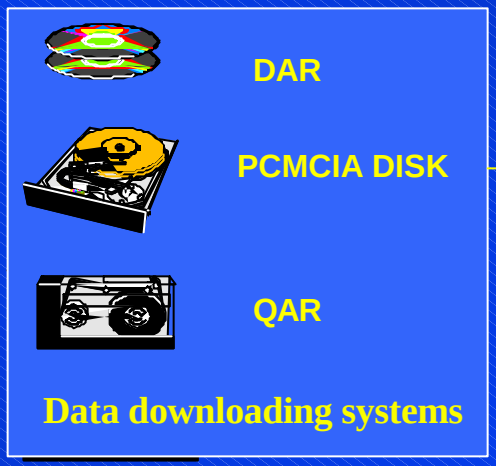
INFORMATION

Towards Flight Operations Quality Assurance with LOMS





FDRS

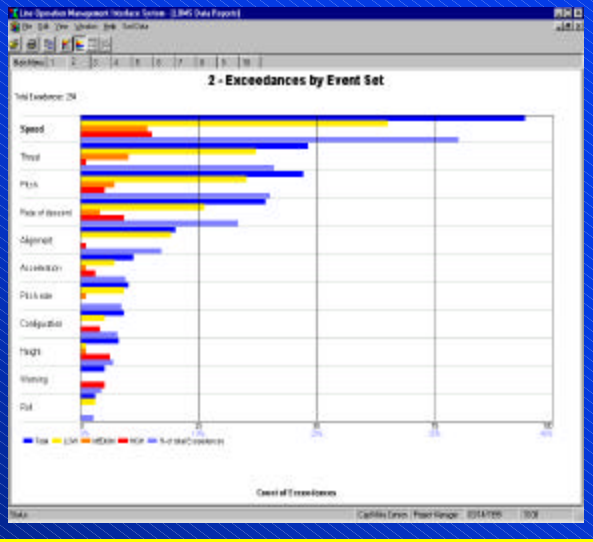


aircraft data

LOMS

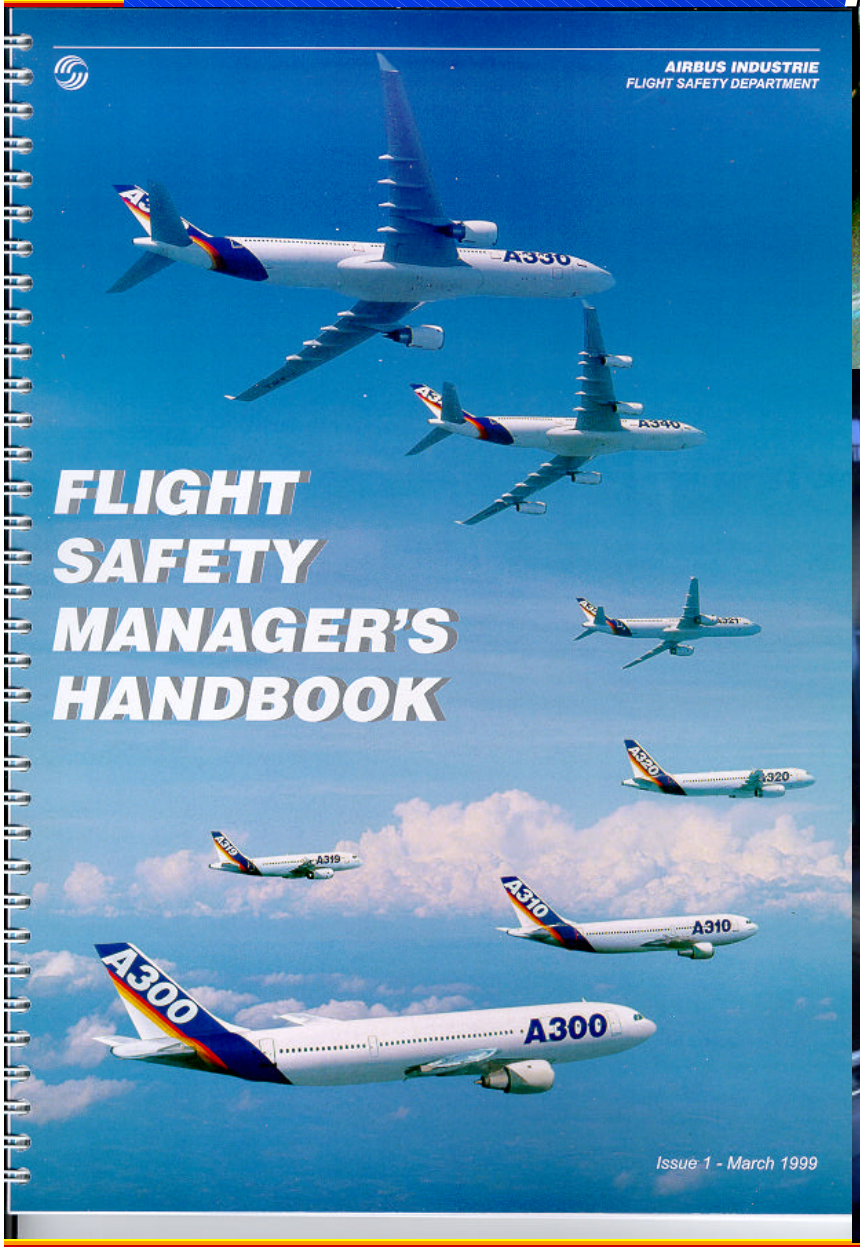
Crew Performance measurement, Trend analysis potential risk detection

Statistical reporting



Flight replay

For Manufacturer-Operator Sharing Programs



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Lessons Learnt from co-operating with airlines

- Over the years,Airbus Industrie has been working with a large customer base on many urgent safety issues,
  - wind-shear,
  - volcanic ash,
  - smoke removal,
  - wake turbulence,
  - unreliable airspeed,
  - abnormal gear position,
  - dispatch reliability revisits,
  - A320 PIP interface improvement,
  - vertical navigation database management,
- This culture of sharing will open up to incident & event reporting if we can agree to share some lessons learnt,

Lessons Learnt from co-operating with airlines

- Stimulate confidential & multi-channel reporting:
  - train to enrich reporting context, causes & circumstances,
  - be aware of losing momentum if no timely feedback,
- Create conditions & processes for co-operative safety:
  - information sharing with “professional call-back” procedures,
  - Manufacturers & AA not to behave as Big Brother watching,
- Realize that for enriched Return of Experience:
  - it cannot be identical at airline and at manufacturers’ level,
  - liability experts should be integrated early on in the process,
- Aim to derive information from databases methodically:
  - by unveiling sense & order and by discovering precursors,
  - by assessing system redundancy & robustness of defences,

Lessons : Combine Clinical & Statistical Analyses to Ask Intelligent Questions

Information

Archiving

«Statistical» Analysis

Fonctionning of the System

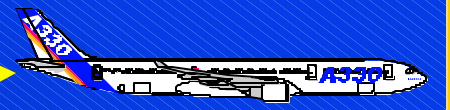
Reporters

Analysts

« Clinical » Analysis

Recommandations

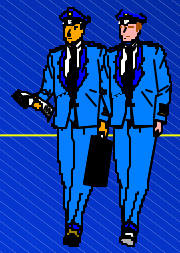
Lessons : Stimulate LOMS with AIRS & vice-verca for more focus in FOQA !



Detection : LOMS

Crew Performance Measurement

Aircraft Data



Confidentiality management

Reporting : AIRS

Confidential Aircrew Incident Reports

Potential major risk alert

Pilot assessment

What happened

Why it happened

Operational Analysis for Risk Assessment & Decision-making on Safety Strategies

Operational/safety actions

Training actions

Lessons :
Limitations of current analysis systems

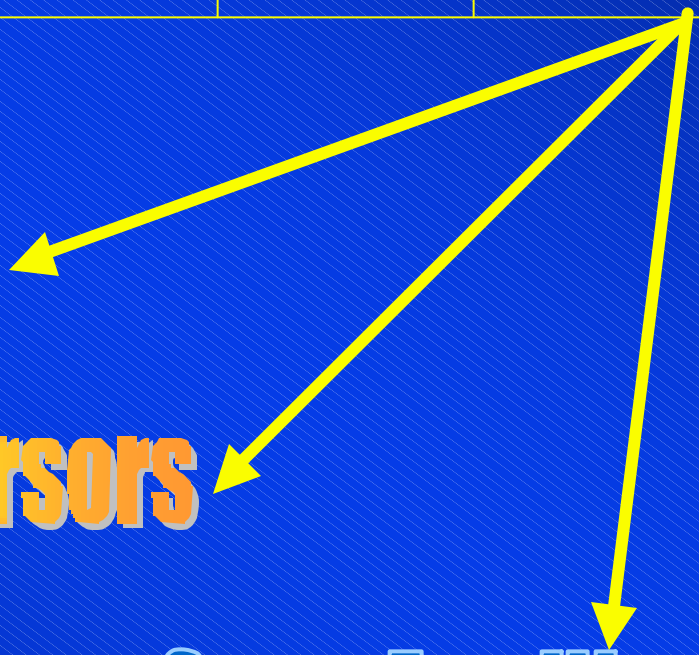
- Anonymity is of little value,confidentiality is fine with a range of appropriate security levels,
- Reporters often will produce biased reports,
- Reports often do contain safety assumptions bias,
- Data Bases contain subjective causal attribution, keyword limitations,self-fulfilling prophecies,
- Trend analyses show poor inter-analyst reliability,
- No follow-up,no feedback on safety assumptions,
- Mapping across taxonomies & databases may bias causality,stressing need for common tools,

Lessons Learnt from sharing incident reporting

- Focus on specific,well documented ,high concern incidents,
- Invite airlines to identify specific precursors based on events,
- Standardize reports to aggregate statistics ,scrutinize texts & coded categories for clear frequencies , build up base rate info,
- To measure safety performance, disregard all events for which guaranteed reporting cannot be assured to take place,
- Pool airline resources for experience if too scarce or no means,
- Train local analysts and give feedback on how coding impacts,
- Record all changes in design, procedures or training to track,
- Develop prevention strategies & verify applications & influence,
  - if clinical analyses fall short of contextual information,reviews of consequences from statistical analyses may still contribute,
  - CAST & JSSI are reviewing a range of intervention strategies in the realm of CFIT,ALAR,Loss of Control,Runway Incursion,

ISO Screening for ARM/LOFU preparation

DATE *a/c, msn* *OPERATOR*	ATA chapter Phase	EVENT CODE	STRUCTURED EVENT NARRATIVE	ISRO ARM LOFU HF	**OPERATIONAL ANALYSIS**



Immediate Action

Identifying Precursors

Program CrossFertilisation

What IF 's for preventive safety strategies!

AIRCRAFT FIRE DURING REFUELLING

- Leaking Fuel bowser hose sprayed fuel on eng 2 hot section
- Fire erupted and engulfed RH MLG
- Tires burnt
- RH wing & engine severely damaged

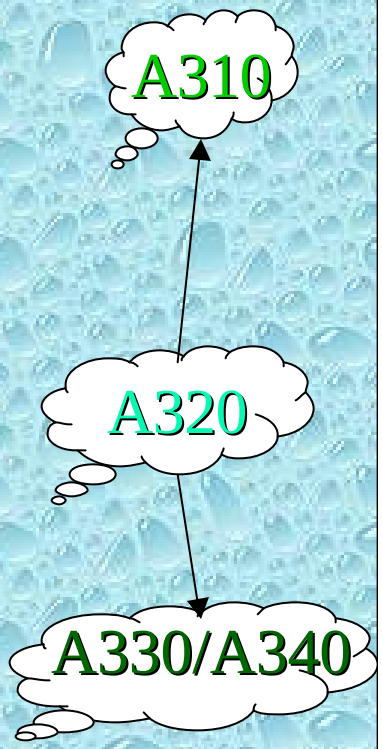
IMMEDIATE ACTION

OIT requested for information and recommend's after review of AMM05

IDENTIFYING PRECURSORS

If a similar event were to occur with passengers do we have cockpit & cabin procedures ?

CROSS-FERTILIZATION



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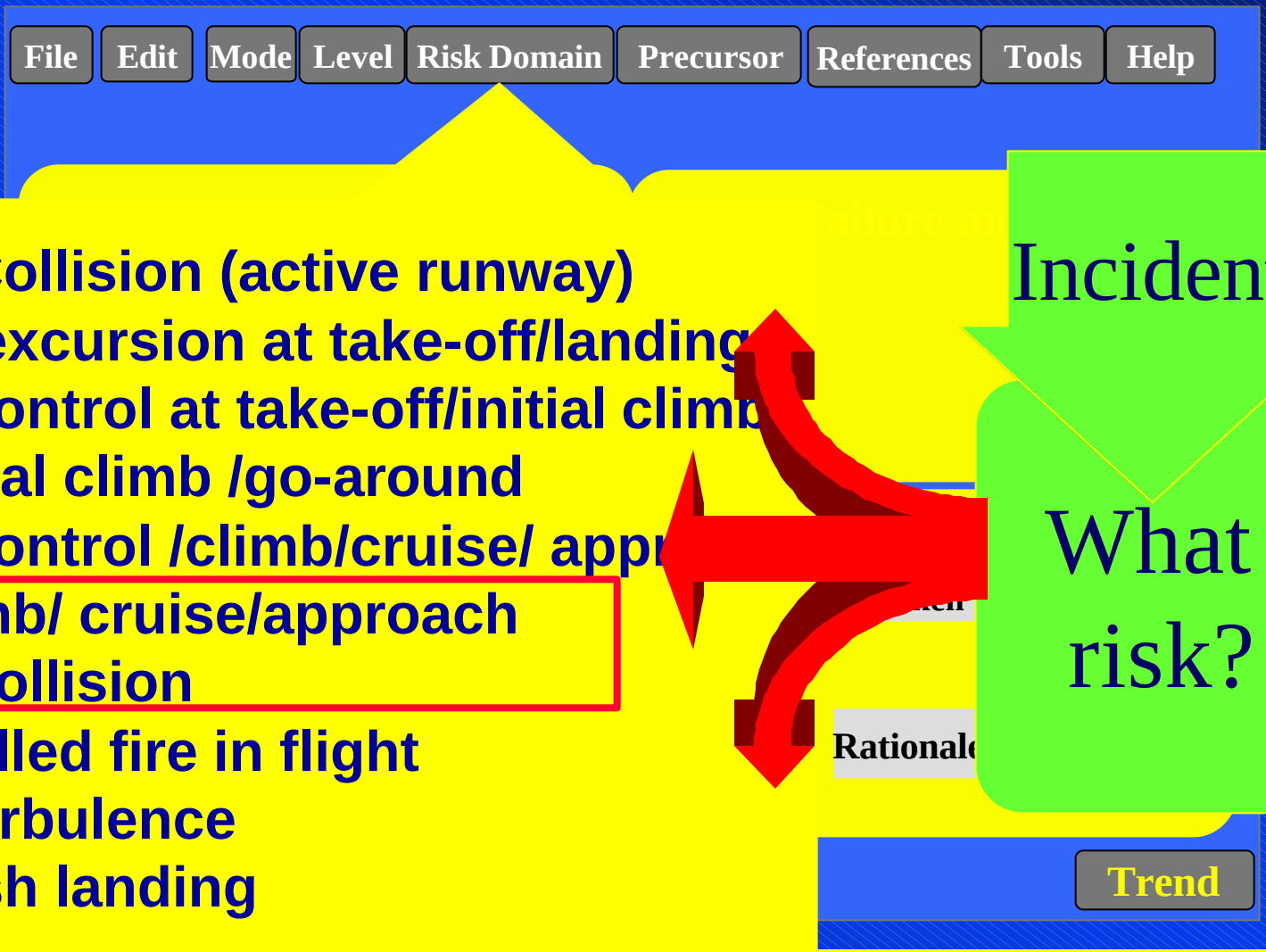
Lessons : Developing & Connecting Databases

Towards a top-down approach

- **Identify risks to be monitored**
- **Explicate safety assumptions/strategies**
- Explicate failure modes
- Explicate recovery modes
- Record corrective decision rationale
- Monitor corrections efficiency
- Amend safety assumptions accordingly

Event Reporting Analysis & Safety Management

Identify Risk Domains



Event Reporting Analysis & Safety Management

Challenge Implicit Safety Strategies

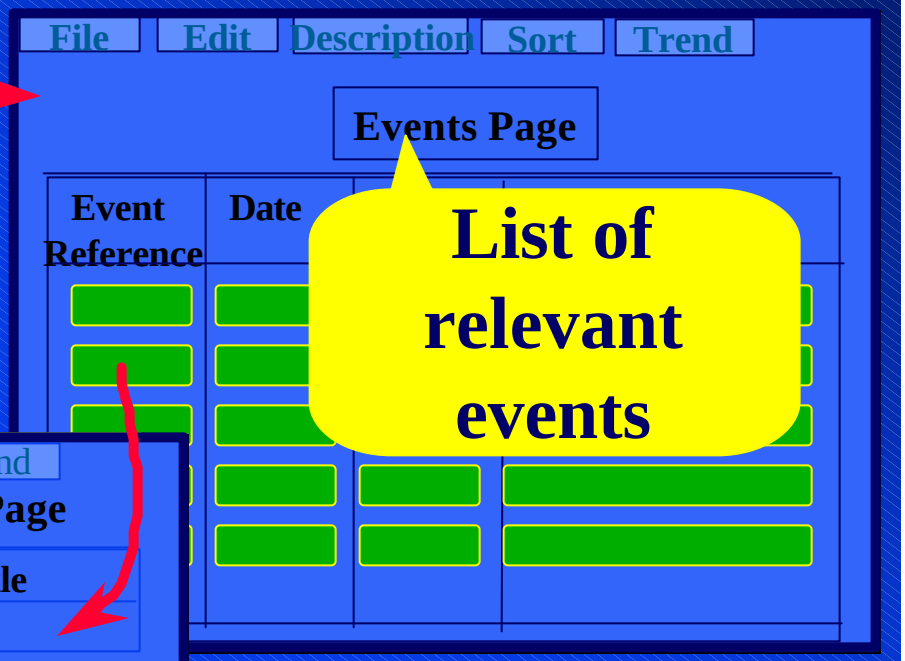
Bringing to bear ERASM

Links with raw incident data (1)

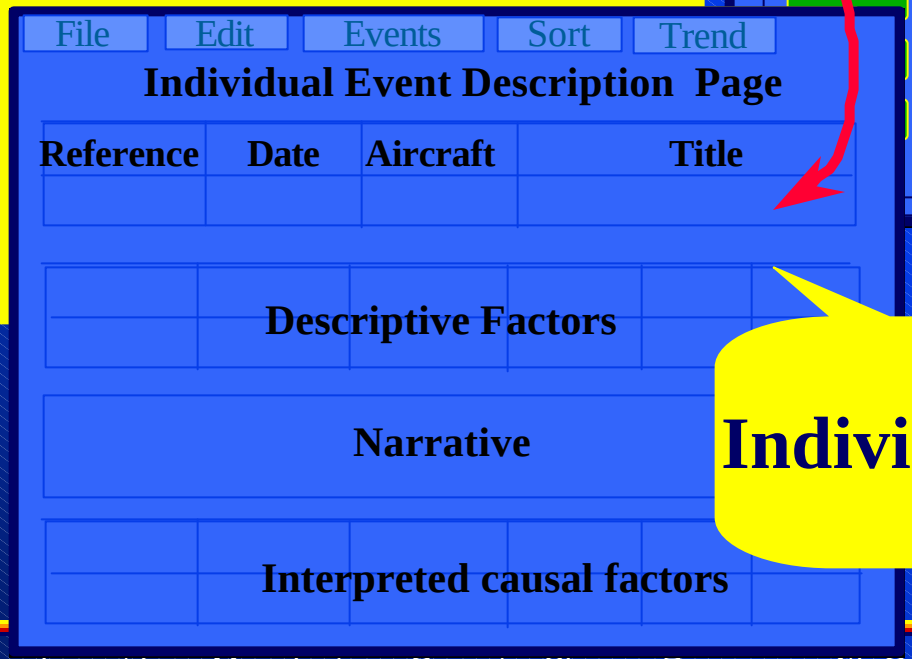
Safety Strategies

.....

Warning detection assumption



List of relevant events



Individual event data

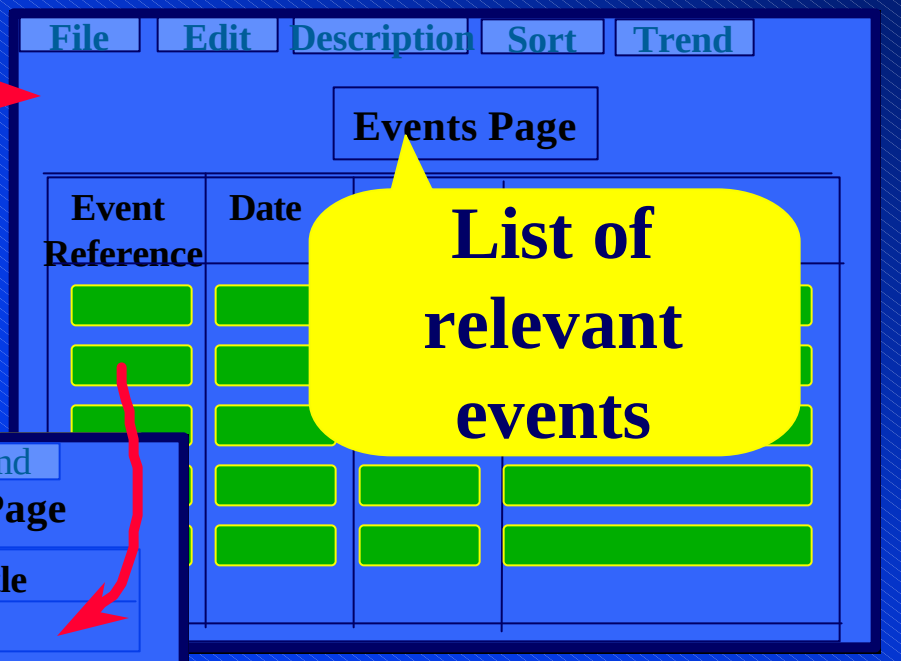
Bringing to bear ERASM

Links with raw incident data (2)

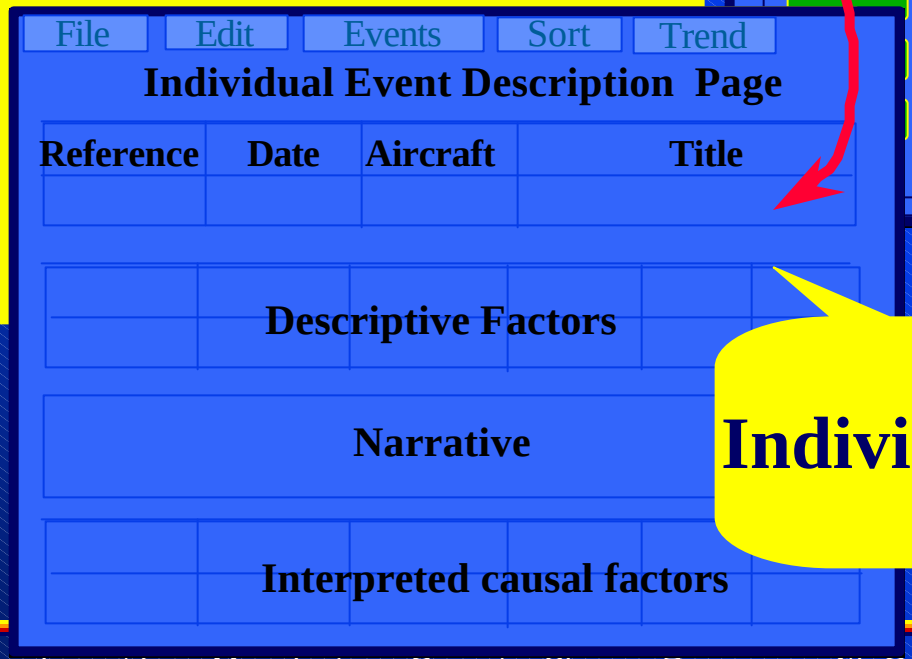
Failure Modes

.....

Crew will miss ALT warning ...



List of relevant events



Individual event data

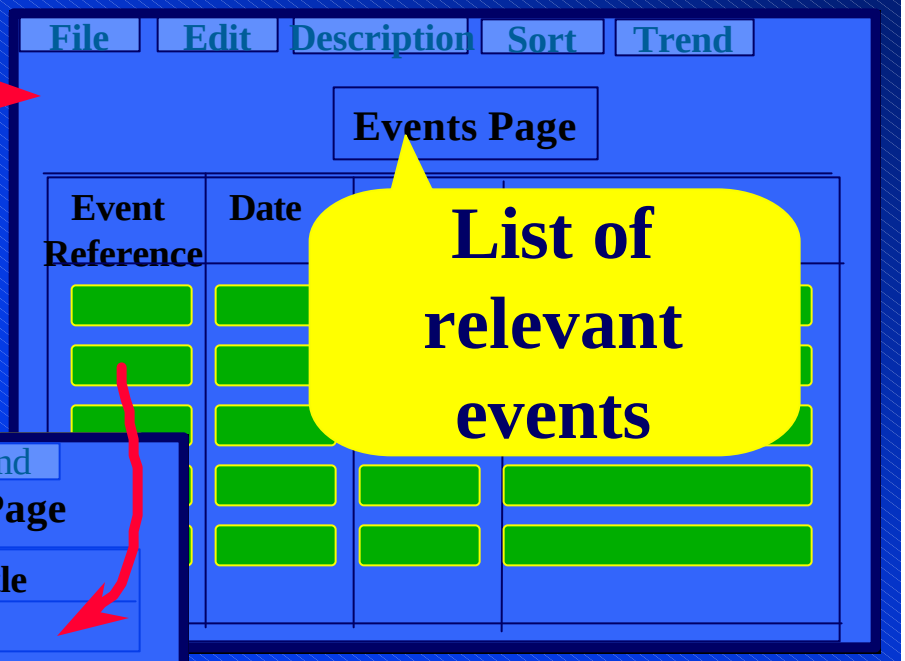
Bringing to bear ERASM

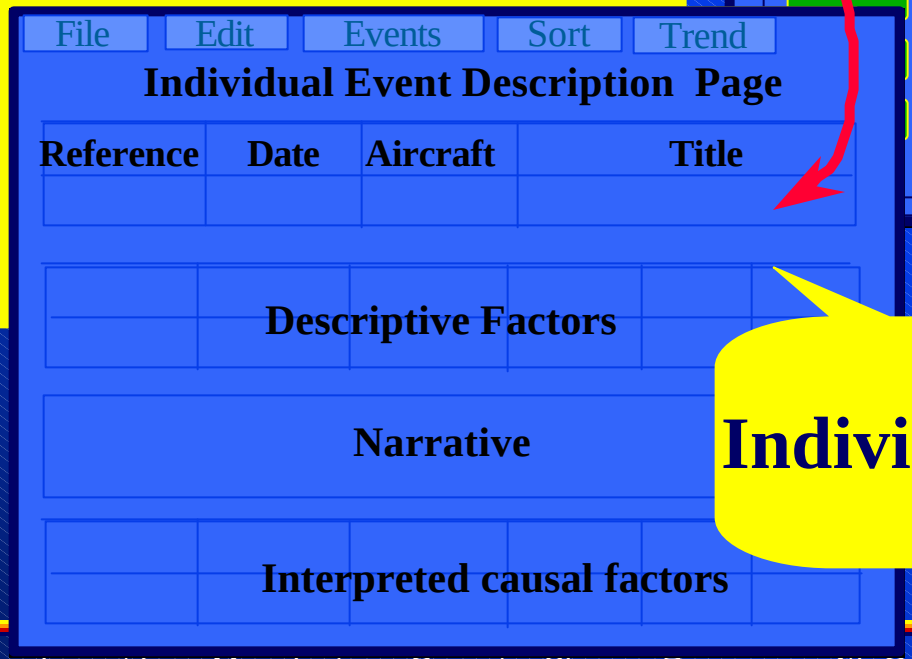
Links with raw incident data (3)

Recovery Modes

.....

ATC Controller will see ...





Individual event data

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Conclusion : Initial Lessons from Sharing

- Safety Information is a dynamic field to be ploughed:
  - for testing defenses from revealing strengths & weaknesses,
  - for scrutinizing opportunities & threats with dedicated tools,
  - for evaluating risk exposure & distance to safety breakdowns,
  - for feedback on efficiency of corrective actions & safety strategies to manage defenses by protecting from precursors,
- Linking Databases mandates a Top-Down approach:
  - to explore, to review & to trace risk domains methodically,
- Return of Experience processes can work in earnest:
  - with both reactive & proactive data-driven analytical methods,
  - with decision trace-ability on corrective & preventive actions,
  - with economics in mind,adapting defenses as threats evolve,
  - with a “sharing culture” rather than a “compliance culture”.